REMARKS

Claims 1-23 are pending. Claims 11-23 are withdrawn as being directed to non-elected subject matter. Claims 1-10 are currently under examination.

Response to Rejections Under 35 U.S.C. § 103(a)

The rejection under 35 U.S.C. § 103(a) over Castillo *et al.*, U.S. Patent No. 6,019,946 ("Castillo *et al.*") and Mosley & Tofield, SOLID STATE GAS SENSORS (IOP Publishing Ltd. 1987) ("Mosley") has been maintained in view of a newly cited reference, Ochiwa, Derwent Information, LTD, patent abstract of JP03-172749 ("Ochiwa"). Ochiwa is a publication by Derwent Information, LTD. For the examiner's convenience, applicants enclose a copy of the patent, JP03-172749, from which the Derwent Information, LTD publication is derived, and also include an English abstract from the Japan Patent Office's website. According to the office action, Castillo *et al.* teaches a gas detecting sensor comprising an oxidation catalyst and insulator fixed to a Joule heater; Mosley teaches an insulating layer and an oxidation catalyst applied thereto; and Ochiwa teaches a silicon film formed on the outside of a sensor to improve its reliability.

The rejection is improper because:

1. The references (alone or in combination) do not account for every element of the claims;
2. Castillo *et al.* teaches away from what is claimed; and
3. Objective evidence of unexpected results exists.

The rejection is improper because it does not account for very element of the claims. To establish *prima facie* obviousness, all the elements of the claims must be found in the prior art. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981 (CCPA 1974). Specifically, the references do not account for an oxidation catalyst in an amount not less than 30 percent by weight. "All the claim limitations must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970). Castillo *et al.*

does not specify any particular range with respect to oxidation catalyst but provides a number of examples that teach away from the claimed amount of oxidation catalyst.

Castillo *et al.* describes three catalyst compositions (*i.e.* Catalyst A, B and C) that contain both an oxidation catalyst and an insulator but the amount of oxidation catalyst of each is approximately 3% by weight, which is at least ***ten times*** less than the minimum amount of 30% by weight recited in the instant claims. The basic compositions of Catalysts A, B, and C are presented below with calculations showing how the percent oxidation catalyst is derived.

Catalyst A (Example 1)

Platinum Amine Hydroxide Salt (18.54% Pt)	46.6 g (18.54% Pt) = 8.6 g (Pt)
gamma Alumina powder	123.6 g
Platinum Amine Hydroxide Salt (18.54% Pt)	1.5 g (18.54% Pt) = 0.3 g (Pt)
Ceria Zirconia Powder	92.6 g
Rhodium Nitrate	18.5 g (10.08% Rh) = 1.9 g (Rh)
gamma Alumina powder	123.6 g
Zirconia hydroxide	35.0 g (27% solids) = 9.5 g (solids)

Oxidation catalyst = 8.6g (Pt) + 0.3 g (Pt) + 1.9 g (Rh) = 10.8 g
Insulator = 123.6 g (alumina) + 92.6 g (zirconia) + 123.6 g (alumina) + 9.5 g (zirconia) = 349.3 g

$$\% \text{ Oxidation Catalyst} = \frac{10.8 \text{ g}}{10.8 \text{ g} + 349.3 \text{ g}} \times 100 = \mathbf{3.0\%}$$

Catalyst B (Example 4)

Platinum Amine Hydroxide Salt (18.54% Pt)	22.9 g (18.54% Pt) = 4.2 g (Pt)
Calcined Alumina	61.8 g
Platinum Amine Hydroxide Salt (18.54% Pt)	0.74 g (18.54% Pt) = 0.1 g (Pt)
Ceria	46.4 g
Rhodium Nitrate (10.35% Rh)	9.0 g (10.35% Rh) = 0.9 g (Rh)
Calcined Alumina	61.8 g
Zirconia Hydroxide	5.0 g

Oxidation catalyst = 4.2 g (Pt) + 0.1 g (Pt) + 0.9 g (Rh) = 5.2 g
Insulator = 61.8 g (alumina) + 46.4 g (Ceria) + 61.8 g (alumina) + 5.0 g (zirconia) = 175.0 g

$$\% \text{ Oxidation Catalyst} = \frac{5.2 \text{ g}}{5.2 \text{ g} + 175.0 \text{ g}} \times 100 = \mathbf{2.9\%}$$

Catalyst C (Example 6)

Platinum Amine Hydroxide Salt (15.5% Pt)	57.5 g (15.5% Pt) = 8.9 g (Pt)
Calcined Alumina	216.4 g
Rhodium Nitrate (10.35% Rh)	18.5 g (10.35% Rh) = 1.9 g (Rh)
Ceria Stabilized Zirconia	123.6 g
Zirconia Hydroxide Paste (27% solids)	36.6 g (27% solids) = 9.9 g (solids)

Oxidation catalyst = 8.9 g (Pt) + 1.9 g (Rh) = 10.7 g
Insulator = 216.4 g (alumina) + 123.6 g (Ceria) + 9.9 g (zirconia) = 349.9 g

$$\% \text{ Oxidation Catalyst} = \frac{10.7 \text{ g}}{10.7 \text{ g} + 349.9 \text{ g}} \times 100 = \mathbf{3.0\%}$$

In each of the above examples, the percent weight of oxidation catalyst is approximately 3% but the remaining examples in the specification use catalyst A, B or C in combination with other component so the amount of oxidation catalyst is even lower. For example, in the excerpts of Castillo *et al.* cited and relied on by the office action, the catalyst compositions described above are mixed with glass frit, so the percent weight of oxidation catalyst is ***even lower than 3%***.

A prior art reference that teaches or suggests a preferred embodiment different from the claimed subject matter weighs against a determination of obviousness. *In re Baird*, 16 F.3d 380, 382-83 (Fed. Cir. 1994); *See* also MPEP 2144.08(II)(A)(4). In *In re Baird*, although the prior art generically encompassed the claimed subject matter, it exemplified compounds differing from the claimed compounds. The court held that applicants' claimed subject matter was NOT obvious. By exemplifying compounds different from the claimed compounds, the prior art served to teach away from what applicants discovered and discouraged further investigating of non-exemplified compounds. In the instant case, it is not clear that Castillo *et al.* even generically encompasses the claimed subject matter. Instead, it exemplifies an amount of oxidation catalyst of, at most, about 3%. Thus, one of ordinary skill in the art, based on the

teaching of Castillo *et al.* would be motivated to use low amounts of oxidation catalyst instead of the opposite extreme encompassed by the instant claims.

Mosley also does not specify or recognize the importance of any particular ranges with respect oxidation catalyst. It explains that a coil is repeatedly immersed in aluminum nitrate (insulator) to form a "bead" and the "catalyst solution is then applied to the alumina bead".

Like Castillo *et al.* and Mosley, Ochiwa also does not specify or recognize the importance of oxidation catalyst in an amount higher than 30% by weight, but suggests a low amount of oxidation catalyst based on the following Figure.

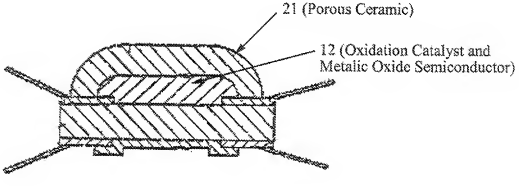

Figure 1

The area designated by the number "12" is a combination of oxidation catalyst and metallic oxide semiconductor (insulator). The area designated with the number "21" is porous ceramic (insulator). Also note that Ochiwa demonstrates the ***opposite*** of what is claimed in claims 3-4. Ochiwa presents the insulator surrounding the outside of the oxidation catalyst. Claims 3-4, however, are directed to the opposite orientation, *i.e.*, sensors where the oxidation catalyst is on the outside of the insulator.

Thus, the references do not account for the claimed amount of oxidation catalyst, but actually lead away from high amounts of oxidation catalyst based on the teachings of Castillo *et al.* Accordingly, for this reason alone, the rejection is improper and should be withdrawn.

Nonetheless, objective evidence of unexpected results exists. The Supreme Court recently affirmed the importance of "secondary considerations" in the determination of obviousness. *KSR Int'l Co. v. Teleflex, Inc.* No. 04-1350, slip op. at 2 (U.S. Apr. 30, 2007). "[E]vidence rising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983); MPEP 716.01(a). Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. *In re Chupp*, 816 F.2d 643, 646 (Fed. Cir. 1987); MPEP 716.02(II).

In the instant case, applicants have demonstrated the criticality of the claimed range and shown unexpected results attained by having the oxidation catalyst powder being "not less than 30 percent by weight". Table 1 lists five compositions differing in the amount of oxidation catalyst powder.

TABLE 1

	Insulating Powder	Oxidation Catalyst Powder		Total Catalyst
Symbol	Al_2O_3 (wt %)	Pd (wt %)	Pt (wt %)	Quantity (wt %)
●	92	7	1	8
■	82	13	5	18
○	67	22	11	33
□	45	45	10	55
Δ	0	80	20	100

Figure 2 provides data for sensors according to the instant claims having the composions presented in Table 1. The sensors having the oxidation catalyst powder in claimed range (at least 30% by weight) drastically outperform sensors having the oxidation catalyst powder outside the claimed range (less than 30% by weight). Figure 2 is reproduced below with arrows and an explanation for each line of the graph.

FIG. 2

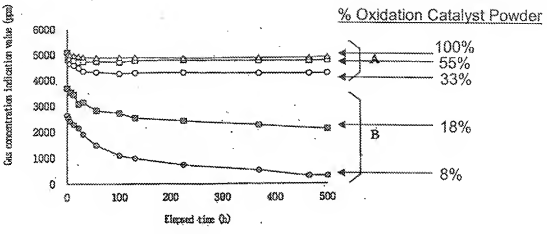

Figure 2 illustrates how very little loss in sensitivity occurs when the amount of oxidation catalyst is at least 30% by weight compared to when the amount of oxidation is lower. This result is surprising, especially considering that Castillo *et al.* suggests using oxidation catalyst in an amount of 3% and lower. Accordingly, the claims should be allowed because applicants have shown the criticality of the claimed range and presented objective evidence of unexpected results.

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 21398-00036-US1 from which the undersigned is authorized to draw.

Dated: July 1, 2008

Respectfully submitted,

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